



Title: LOW LOSS TUNABLE FERRO-ELECTRIC
DEVICE AND METHOD OF CHARACTERIZATION

Inventor: TONCICH, STANLEY S.

Filing Date: 12/31/2003

Appl. No.: 10/750,304

Atty. Doc. No.: UD1 00001

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DI 4/8/05

1/6

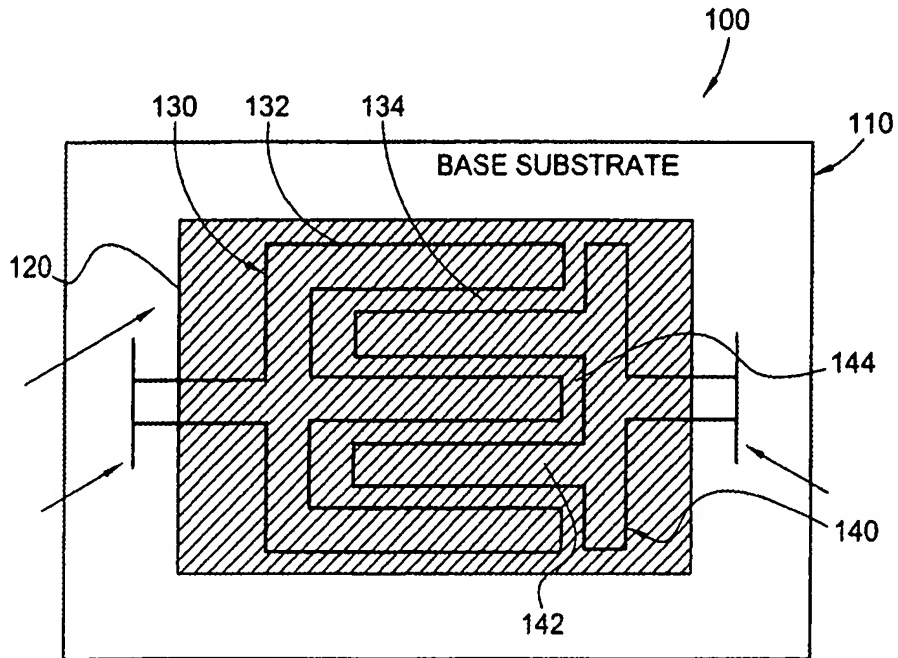


FIG. 1

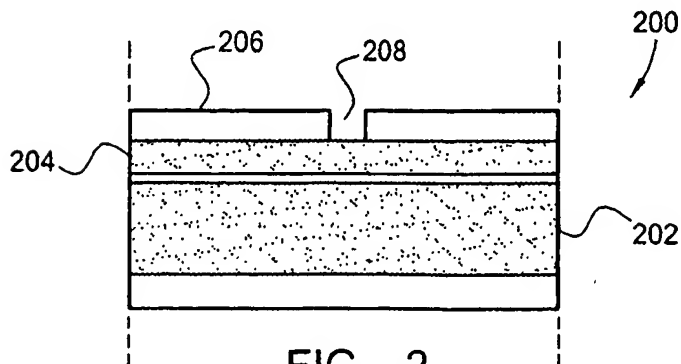


FIG. 2



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GAP CAPACITANCE
0.5 MICRON THICK f-e FILM, DK = 1000, TAN (d) = .002
40 MIL THICK Al2O3

The graph plots Capacitance in pF on the y-axis (0.000 to 2.000) against Gap Width in Mils on the x-axis (80 to 30). Four data series are shown: 5 MICRONS (diamonds), 10 MICRONS (squares), 15 MICRONS (triangles), and 20 MICRONS (crosses). All series show a downward trend as gap width decreases.

GAP WIDTH (MILS)	5 MICRONS (pF)	10 MICRONS (pF)	15 MICRONS (pF)	20 MICRONS (pF)
80	1.50	1.20	1.00	0.90
70	1.35	1.05	0.90	0.80
60	1.15	0.95	0.80	0.70
50	1.00	0.80	0.70	0.60
40	0.80	-	-	-
30	0.55	-	-	-

300

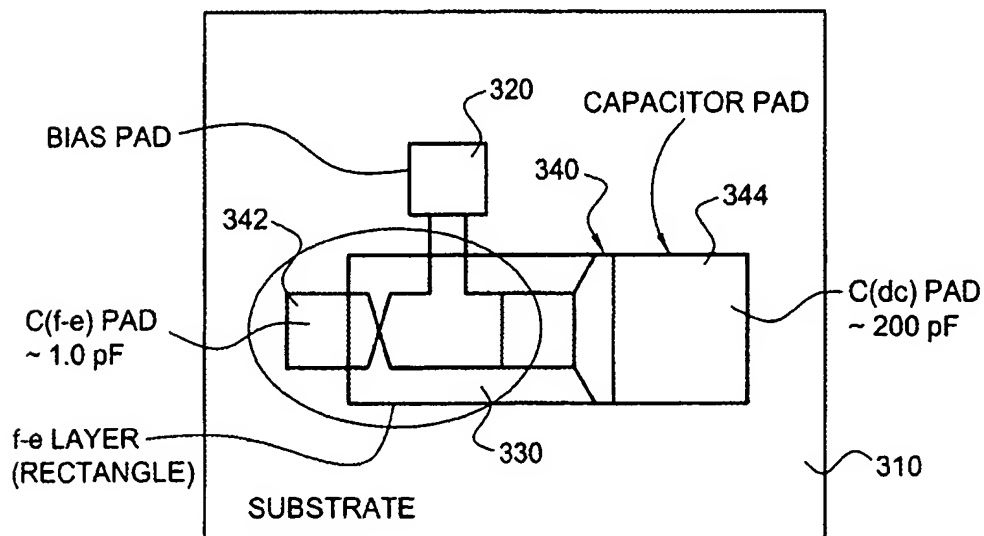


FIG. 4

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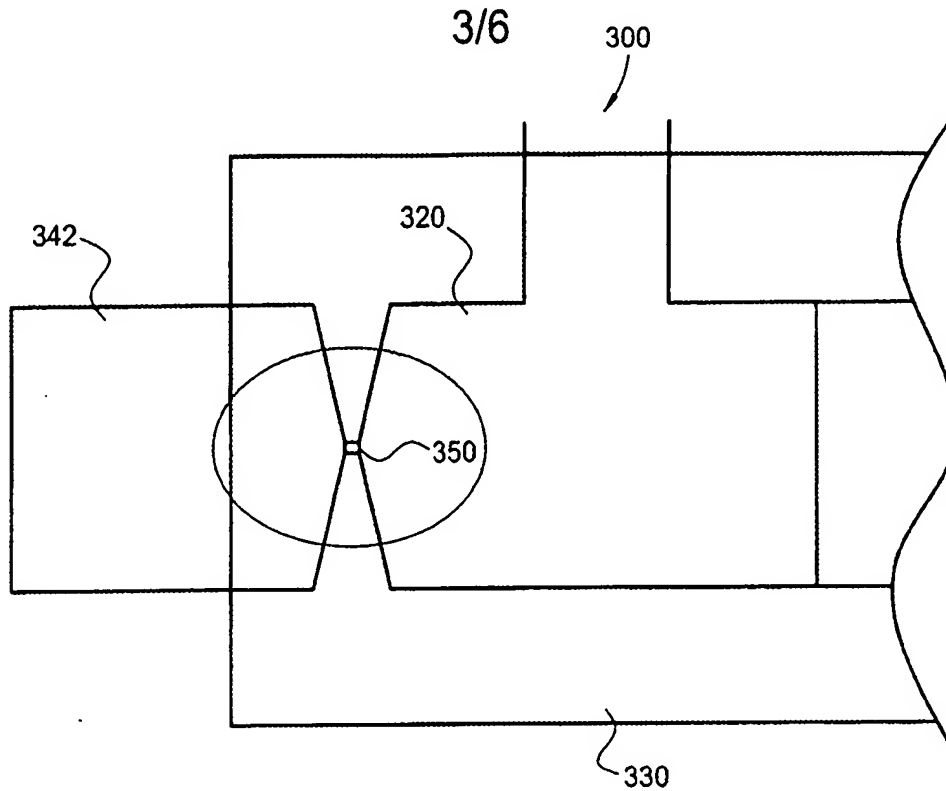


FIG. 5

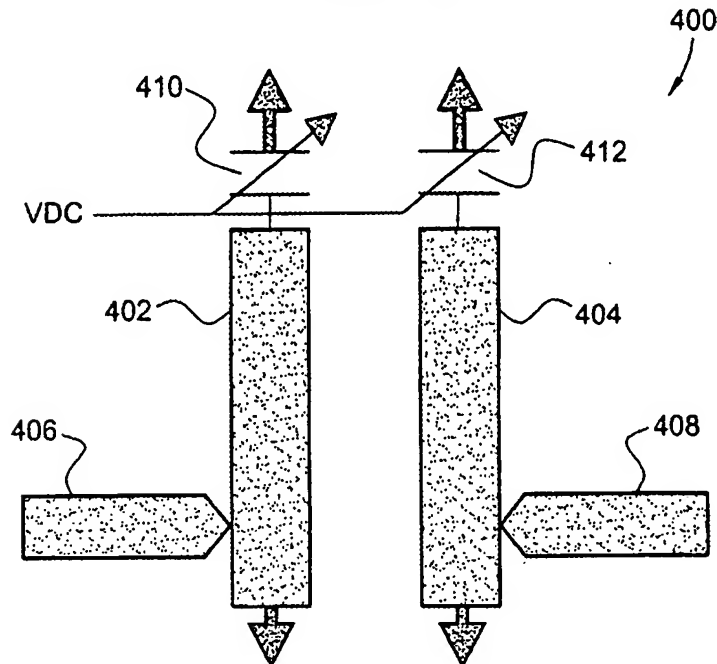


FIG. 6

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4/6

KWC	NRL	NRL CAPA- CITOR	NRL Q	KWC CAP	KWC Q	KWC Q	f ₀	TUN- ING	COM- MENTS
SAM- PLE #	SAM- PLE #	(pF)	(0 VDC)	(pF)	(0 VDC)	(40 VDC)	(MHz)	(MHz/ V)	
01	NRL # 1-A	1.012	10.1	0.99	190		1622	~ 1.0	
02	NRL # 1-A	1.012	10.1	0.96	183		1605	~ 1.0	
01	NRL # 3-A	1.004	10.1	0.90	101	123	1610	~ 1.0	
02	NRL # 2-A	0.76	10.2	0.75	200		1900	~ 0.5	
06	NRL # 2-A	0.76	10.2	0.72	205			~0.5	DAMAGED, HIGH V
05	NRL # 2-A	0.76	10.2	0.71	196	200	1912	~ 0.5	

FIG. 7

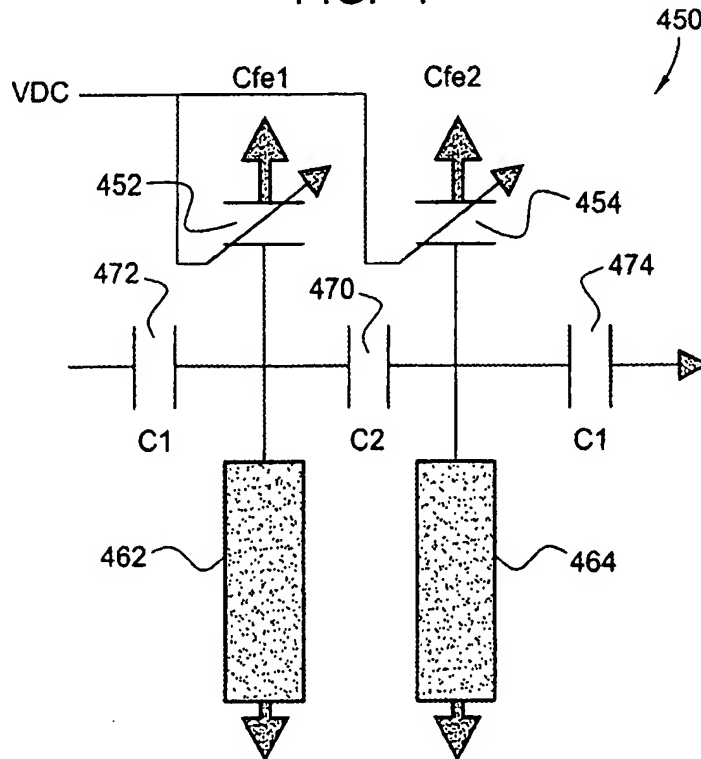


FIG. 8

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5/6

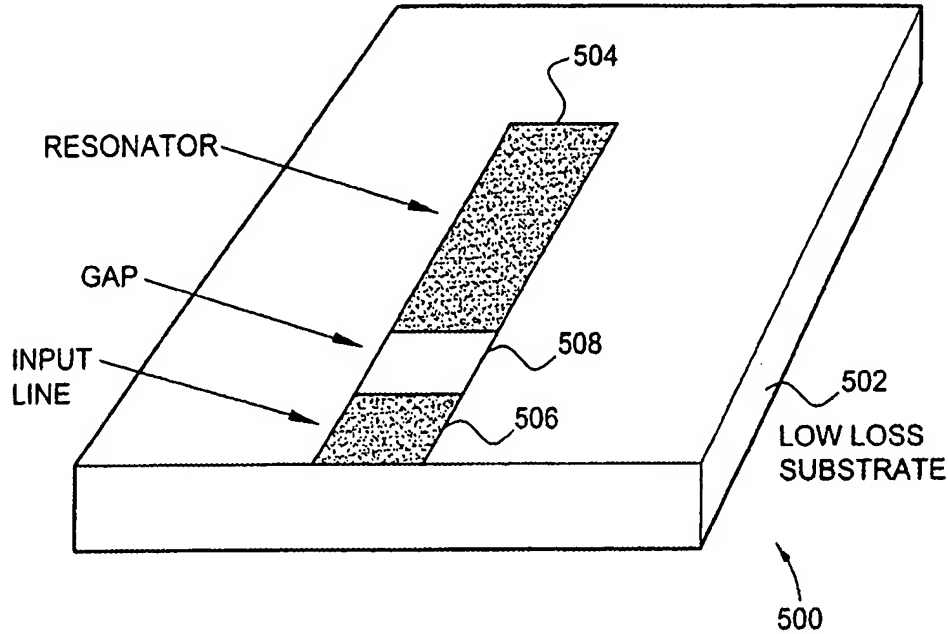


FIG. 9

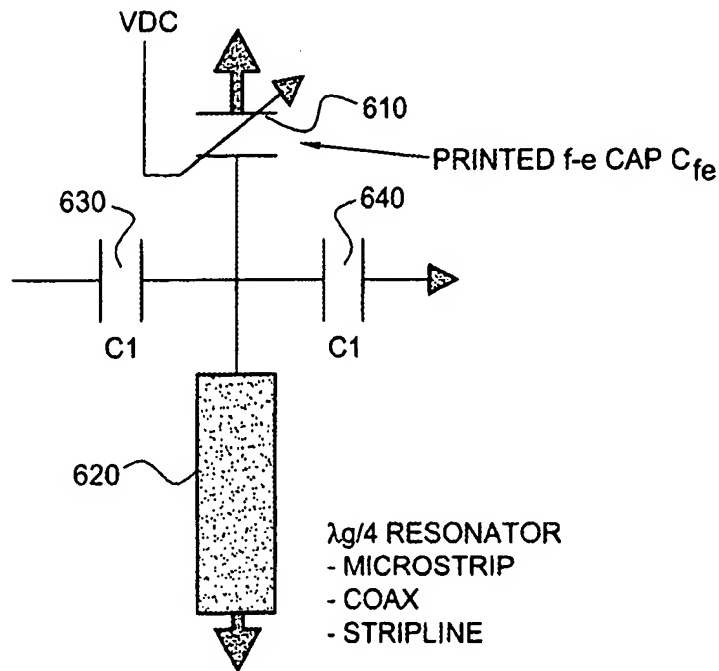


FIG. 10a



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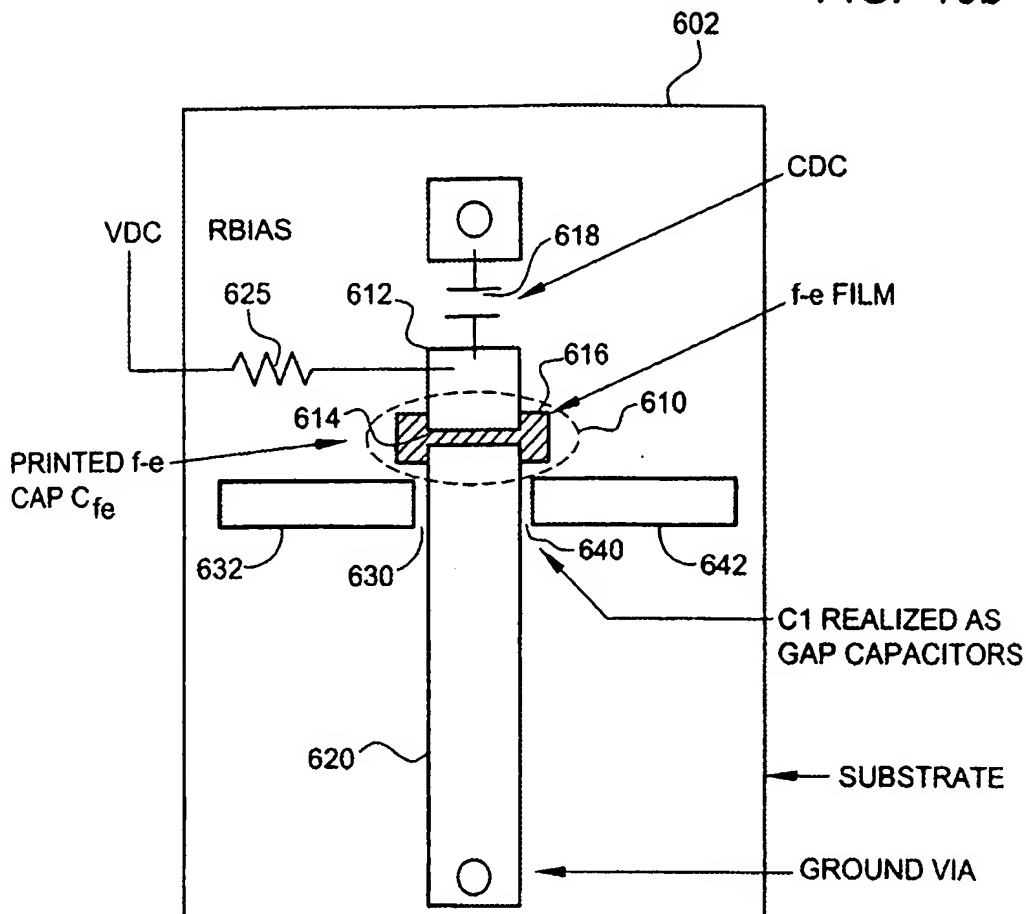
REPLACEMENT SHEET

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6/6

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FIG. 10b



PLANAR REALIZATION OF SINGLE RESONATOR BPF.
CAN BE REALIZED WITHOUT VIA'S USING GROUND PLANES
& A WILTRON TEST FIXTURE.

EXAMPLE OPERATING PARAMETERS

Temperature (degrees C)

Example 1: -50 to 100

Quality Factor (Q)

Example 1: > 80

Example 2: > 180

Capacitance (pF)

Example 1: 0.3 to 3.0

Example 2: 0.5 to 1.0

Example 3: 0.8 to 1.5

Frequency (GHz)

Example 1: 0.25 to 7.0

Example 2: 0.8 to 7.0

Example 3: 0.25 to 2.5

Example 4: 0.8 to 2.5

